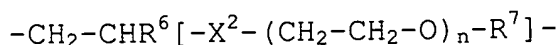


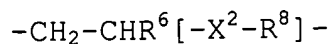
WHAT IS CLAIMED IS:

1. A zwitterionic polymer comprising units comprising a
5 betaine group, characterized in that it comprises:
- at least 35 mol% of units comprising a betaine group,
the betaine group comprising a cationic group and an
anionic group, and
- additional units chosen from:
10 - alkoxyated units of following formula:



in which:

- 15 - R^6 is a hydrogen atom or a methyl group,
- X^2 is a group of formula $-\text{CO}-\text{O}-$, $-\text{CO}-\text{NH}-$ or $-\text{C}_6\text{H}_4-\text{CH}_2-$,
- n is an integer or mean number of greater
than or equal to 1,
20 - R^7 is a hydrogen atom, an alkyl group or a
tristyrylphenyl group, and/or
- hydroxylated units of following formula:



25

in which:

- R^6 is a hydrogen atom or a methyl group,
- X^2 is a group of formula $-\text{CO}-\text{O}-$, $-\text{CO}-\text{NH}-$ or $-\text{C}_6\text{H}_4-\text{CH}_2-$,
30 - R^8 is a hydrocarbon group of at least two
carbon atoms comprising at least two $-\text{OH}$
groups, preferably on two consecutive carbon
atoms.

- 35 2. The polymer as claimed in the preceding claim,

characterized in that the anionic group is a carbonate, sulfonate, phosphate, phosphonate, phosphinate or ethenolate group and in that the cationic group is an ammonium, pyridinium, imidazolinium, phosphonium or
5 sulfonium group.

3. The polymer as claimed in either of the preceding claims, characterized in that the betaine groups are pendent groups of the polymer.

10

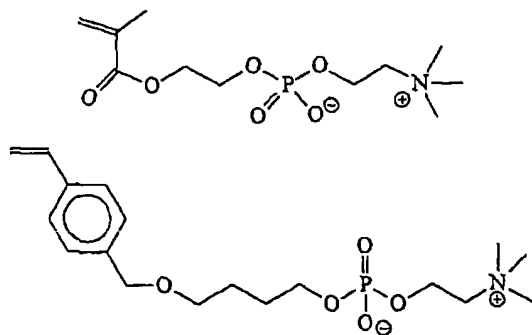
4. The polymer as claimed in one of the preceding claims, characterized in that the units comprising a betaine group and optionally the alkoxyated and/or hydroxylated units form a polyalkylene hydrocarbon chain optionally
15 interrupted by one or more nitrogen or sulfur atoms.

5. The polymer as claimed in one of the preceding claims, characterized in that the units comprising a betaine group:

20 - derive from at least one betaine monomer selected from the group consisting of the following monomers:

- alkyl sulfonates or phosphonates of dialkylammonium alkyl acrylates or methacrylates, acrylamido or methacrylamido, preferably:
- 25 - sulfopropyl dimethylammonioethyl methacrylate,
 - sulfoethyl dimethylammonioethyl methacrylate,
 - sulfobutyl dimethylammonioethyl methacrylate,
 - sulfohydroxypropyl dimethylammonioethyl methacrylate,
- 30 - sulfopropyl dimethylammonioethyl methacrylamide,
 - sulfopropyl dimethylammonioethyl methacrylamide,
 - sulfopropyl diethylammonioethyl methacrylate,
 - sulfohydroxypropyl dimethylammonioethyl methacrylamide,
- 35 - sulfohydroxypropyl diethylammonioethyl methacrylate,

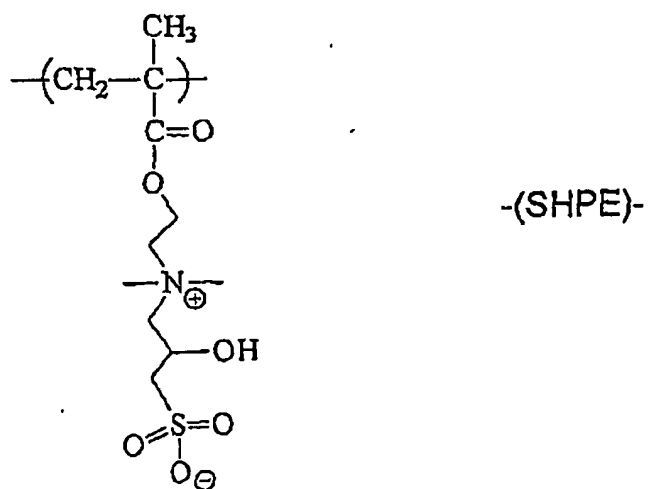
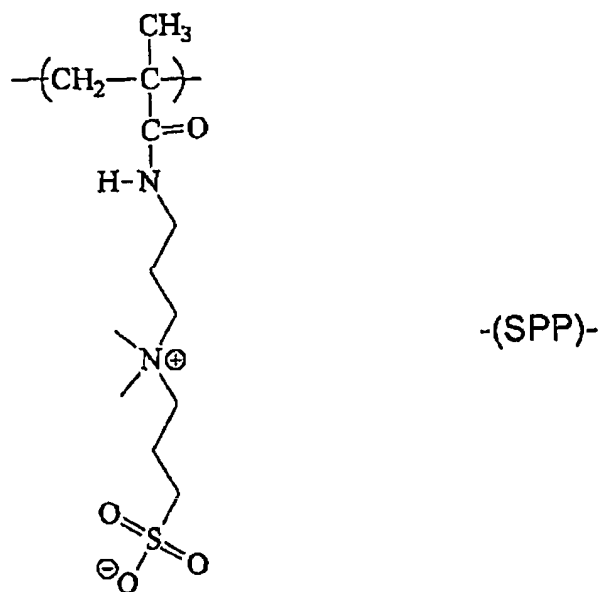
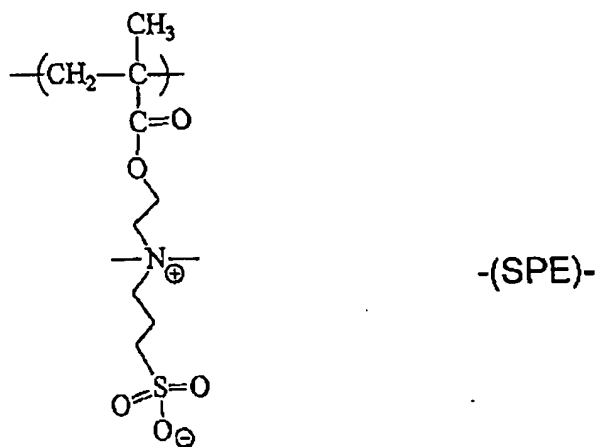
- heterocyclic betaine monomers, preferably:
 - sulfobetaines derived from piperazine,
 - sulfobetaines derived from 2-vinylpyridine and 4-vinylpyridine, very particularly 2-vinyl-1-(3-sulfopropyl)pyridinium betaine or 4-vinyl-1-(3-sulfopropyl)pyridinium betaine,
 - 1-vinyl-3-(3-sulfopropyl)imidazolium betaine,
- alkyl sulfonates or phosphonates of dialkylammonium alkyl allylics, preferably sulfo-propylmethyldiallylammonium betaine,
- alkyl sulfonates or phosphonates of dialkylammonium alkyl styrenes,
- betaines resulting from ethylenically unsaturated anhydrides and dienes,
- phosphobetaines of formulae

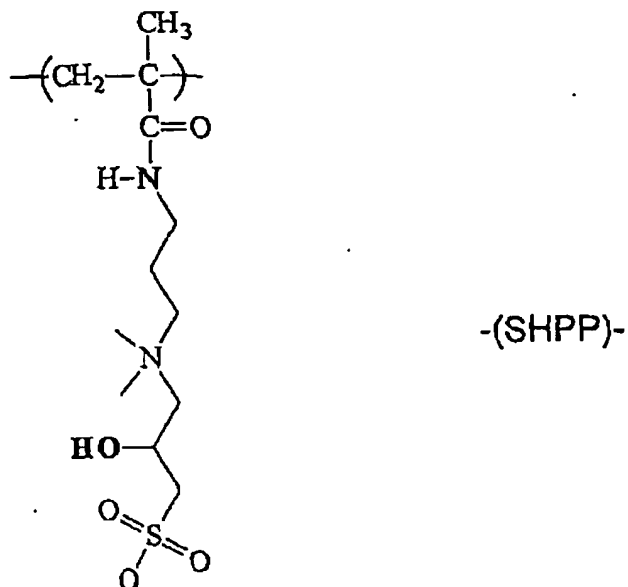


- betaines resulting from cyclic acetals, preferably ((dicyanoethanolate)ethoxy)dimethylammoniumpropylmethacrylamide;
- or derive from the chemical modification of units of a precursor polymer, preferably by chemical modification of a polymer comprising pendent amine functional groups, using a sulfonated electrophilic compound, preferably a sultone.

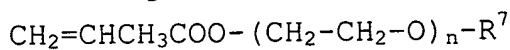
6. The polymer as claimed in one of the preceding claims, characterized in that the units comprising a betaine

group exhibit one of the following formulae:





7. The polymer as claimed in one of the preceding claims, characterized in that the alkoxyated units are units
 5 deriving from a monomer of following formula:



in which:

- n is an integer or mean number of greater than or equal to 1,
- 10 - R⁷ is an alkyl group comprising 1 to 30 carbon atoms or a tristyrylphenyl group.

8. The polymer as claimed in claim 7, characterized in that:

- 15 - n is greater than or equal to 10, preferably greater than or equal to 15, and
- R⁷ is a methyl group.

9. The polymer as claimed in claim 7, characterized in
 20 that:

- n is greater than or equal to 10, and
- R⁷ is an alkyl group comprising from 12 to 30 carbon atoms, preferably from 18 to 25.

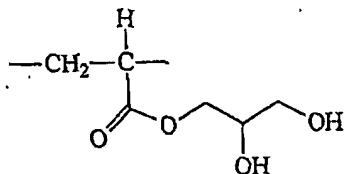
10. The polymer as claimed in claim 7, characterized in that:

- 5 - n is greater than or equal to 10, and
 - R⁷ is a tristyrylphenyl group.

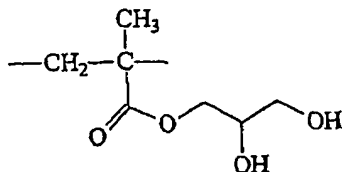
11. The polymer as claimed in one of claims 1 to 6, characterized in that:

- 10 - n is greater than or equal to 10, and
 - R⁷ is a hydrogen atom.

12. The polymer as claimed in one of the preceding claims, characterized in that the hydroxylated units are chosen from the units of following formulae:



-(GMAc)-



-(GMMA)-

15

13. The polymer as claimed in one of the preceding claims, characterized in that it does not comprise other units, the polymer preferably exhibiting solely the units comprising a betaine group and the alkoxyated units or solely the units comprising a betaine group and the hydroxylated units.

14. The polymer as claimed in one of the preceding claims, characterized in that it exhibits a weight-average molecular mass of between 5000 g/mol and

400 000 g/mol, in relative value, measured by GPC calibrated with poly(ethylene oxide) standards.

15. The polymer as claimed in one of the preceding
5 claims, characterized in that it comprises:

- from 65 to 99 mol% of units comprising a betaine group,
- from 55 to 1 mol% of alkoxyated units,

preferably:

- from 70 to 90 mol%, preferably from 80 to 90 mol%, of
10 units comprising a betaine group,
- from 10 to 30 mol%, preferably from 10 to 20 mol%, of alkoxyated units.

16. The polymer as claimed in one of claims 1 to 14,
15 characterized in that it comprises:

- from 80 to 100 (excluded) mol% of units comprising a betaine group,
- from 20 to 0 (excluded) mol% of hydroxylated units.

20 17. A drilling fluid comprising the polymer as claimed in one of the preceding claims.

18. The drilling fluid as claimed in claim 17,
characterized in that the polymer content is between 0.1%
25 and 10%, preferably between 0.1 and 5% and more preferably still between 1% and 3%.

19. The use, in a drilling fluid, as clay-swelling inhibitor and/or as accretion-inhibiting agent and/or as
30 fluid-rheology-controlling agent and/or as filtrate-reducing agent and/or as lubricating agent, of a polymer comprising at least 35 mol% of units comprising a betaine group, the betaine group comprising a cationic group and an anionic group.

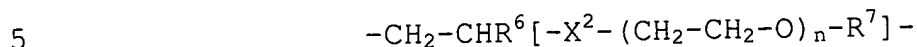
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20. The use as claimed in claim 19, characterized in

that the polymer furthermore comprises:

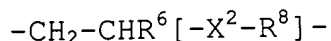
- additional units chosen from:

- alkoxyated units of following formula:



in which:

- 10 - R^6 is a hydrogen atom or a methyl group,
- X^2 is a group of formula $-\text{CO}-\text{O}-$, $-\text{CO}-\text{NH}-$ or $-\text{C}_6\text{H}_4-\text{CH}_2-$,
- n is an integer or mean number of greater than or equal to 1,
- R^7 is a hydrogen atom, an alkyl group or a tristyrylphenyl group, and/or
15 - hydroxylated units of following formula:



in which:

- 20 - R^6 is a hydrogen atom or a methyl group,
- X^2 is a group of formula $-\text{CO}-\text{O}-$, $-\text{CO}-\text{NH}-$ or $-\text{C}_6\text{H}_4-\text{CH}_2-$,
- R^8 is a hydrocarbon group of at least two carbon atoms comprising at least two $-\text{OH}$
25 groups, preferably on two consecutive carbon atoms.

21. The use as claimed in either of claims 19 or 20, characterized in that the anionic group is a carbonate,
30 sulfonate, phosphate, phosphonate, phosphinate or ethenolate group and in that the cationic group is an ammonium, pyridinium, imidazolinium, phosphonium or sulfonium group.

35 22. The use as claimed in either of claims 19 to 20, characterized in that the betaine groups are pendent

groups of the polymer.

23. The use as claimed in one of claims 19 to 22,
characterized in that the units comprising a betaine
5 group and optionally the alkoxyated and/or hydroxylated
units form a polyalkylene hydrocarbon chain optionally
interrupted by one or more nitrogen or sulfur atoms.

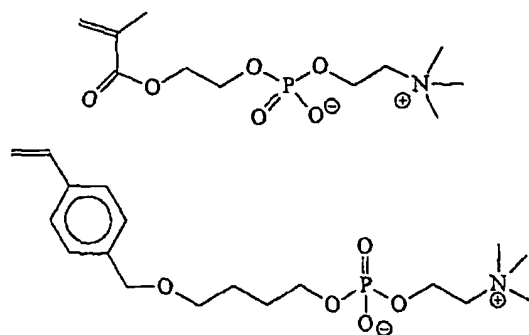
24. The use as claimed in one of claims 19 to 23,
10 characterized in that the units comprising a betaine
group:

- derive from at least one betaine monomer selected from
the group consisting of the following monomers:

- 15 - alkyl sulfonates or phosphonates of dialkylammonium
alkyl acrylates or methacrylates, acrylamido or
methacrylamido, preferably:
 - sulfopropyldimethylammonioethyl methacrylate,
 - sulfoethyldimethylammonioethyl methacrylate,
 - sulfobutyldimethylammonioethyl methacrylate,
 - 20 - sulfohydroxypropyldimethylammonioethyl
methacrylate,
 - sulfopropyldimethylammoniopropylacrylamide,
 - sulfopropyldimethylammoniopropylmethacrylamide,
 - sulfopropyldiethylammonioethyl methacrylate,
 - 25 - sulfohydroxypropyldimethylammoniopropylmeth-
acrylamide,
 - sulfohydroxypropyldiethylammonioethyl
methacrylate,
- heterocyclic betaine monomers, preferably:
 - 30 - sulfobetaines derived from piperazine,
 - sulfobetaines derived from 2-vinylpyridine and
4-vinylpyridine, very particularly 2-vinyl-1-
(3-sulfopropyl)pyridinium betaine or 4-vinyl-1-
(3-sulfopropyl)pyridinium betaine,
 - 35 - 1-vinyl-3-(3-sulfopropyl)imidazolium betaine,
- alkyl sulfonates or phosphonates of dialkylammonium

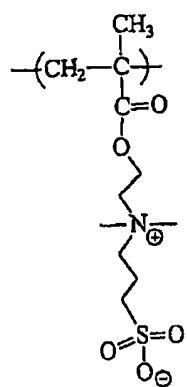
alkyl allylics, preferably sulfo-
propylmethyldiallylammonium betaine,

- alkyl sulfonates or phosphonates of dialkylammonium alkyl styrenes,
- 5 - betaines resulting from ethylenically unsaturated anhydrides and dienes,
- phosphobetaines of formulae

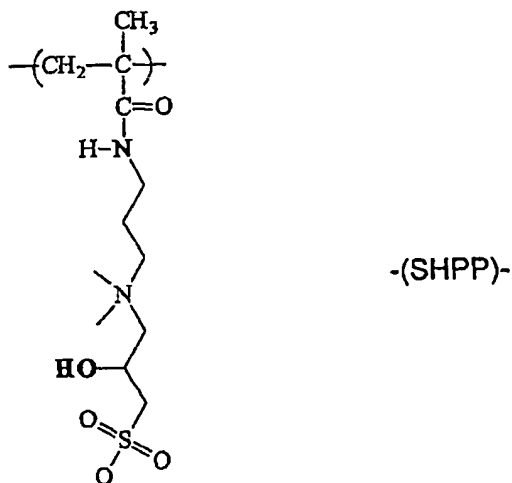
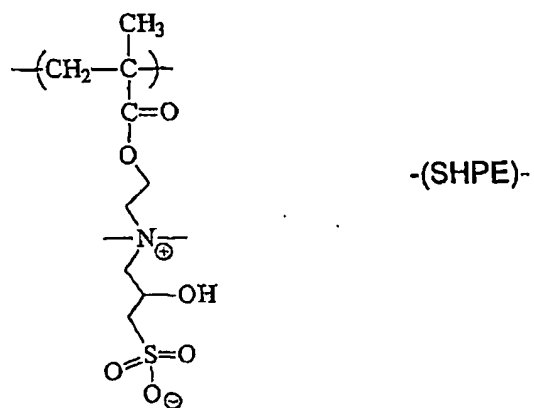
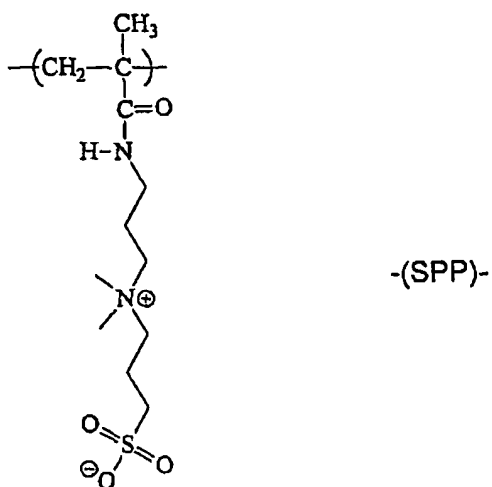


- 10 - betaines resulting from cyclic acetals, preferably ((dicyanoethanolate)ethoxy)dimethylammoniumpropylmethacrylamide;
- or derive from the chemical modification of units of a precursor polymer, preferably by chemical
- 15 modification of a polymer comprising pendent amine functional groups, using a sulfonated electrophilic compound, preferably a sultone.

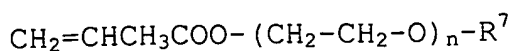
25. The use as claimed in one of claims 19 to 24,
20 characterized in that the units comprising a betaine group exhibit one of the following formulae:



-(SPE)-



5 26. The use as claimed in one of claims 20 to 25, characterized in that the alkoxyated units are units deriving from a monomer of following formula:



in which:

- n is an integer or mean number of greater than or equal to 1,
- 5 - R⁷ is an alkyl group comprising 1 to 30 carbon atoms or a tristyrylphenyl group.

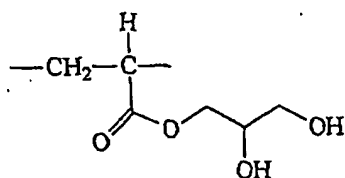
27. The use as claimed in claim 26, characterized in that:
- n is greater than or equal to 10, preferably
 - 10 greater than or equal to 15, and
 - R⁷ is a methyl group.

28. The use as claimed in claim 26, characterized in that:
- n is greater than or equal to 10, and
 - 15 - R⁷ is an alkyl group comprising from 12 to 30 carbon atoms, preferably from 18 to 25.

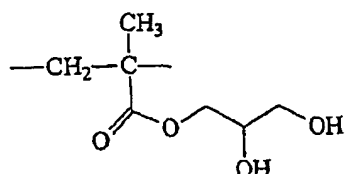
29. The use as claimed in claim 26, characterized in that:
- 20 - n is greater than or equal to 10, and
 - R⁷ is a tristyrylphenyl group.

30. The use as claimed in one of claims 20 to 25, characterized in that:
- 25 - n is greater than or equal to 10, and
 - R⁷ is a hydrogen atom.

31. The use as claimed in one of claims 20 to 30, characterized in that the hydroxylated units are chosen
- 30 from the units of following formulae:



-(GMAc)-



-(GMMA)-

32. The use as claimed in one of claims 19 to 31,
characterized in that it does not comprise units other
5 than the units comprising a betaine group and optionally
the polyalkoxylated and/or hydroxylated units, the
polymer preferably exhibiting solely the units comprising
a betaine group and the alkoxylated units or solely the
units comprising a betaine group and the hydroxylated
10 units.

33. The use as claimed in one of the claims 19 to 32,
characterized in that the polymer exhibits a weight-
average molecular mass of between 5000 g/mol and
15 400 000 g/mol, in relative value, measured by GPC
calibrated with poly(ethylene oxide) standards.

34. The use as claimed in one of claims 20 to 33,
characterized in that the polymer comprises:
20 - from 65 to 99 mol% of units comprising a betaine group,
- from 55 to 1 mol% of alkoxylated units,
preferably:
- from 80 to 90 mol% of units comprising a betaine group,
- from 10 to 20 mol% of alkoxylated units.

25

35. The use as claimed in one of claims 20 to 33,

characterized in that the polymer comprises:

- from 80 to 100 (excluded) mol% of units comprising a betaine group,
- from 20 to 0 (excluded) mol% of hydroxylated units.

5

36. The use as claimed in one of claims 19 to 35, characterized in that the drilling fluid is a fluid for the drilling of a well intended for the recovery of oil and/or gas.

10

37. The use as claimed in one of claims 19 to 36, characterized in that the polymer content of the drilling fluid is between 0.1% and 10%, preferably between 0.1 and 5% and more preferably still between 1% and 3%.

15

38. The use as claimed in one of claims 19 to 37, characterized in that the clay-swelling inhibitor is a well bore consolidation agent.

20

39. The use as claimed in one of claims 19 to 37, characterized in that the accretion-inhibiting agent is an agent which prevents the blocking of a drilling head.

25

40. The use as claimed in one of claims 20 to 37, characterized in that the drilling fluid is an aqueous silicate-based fluid and in that the polymer comprises the hydroxylated units.

30

41. The use as claimed in one of claims 20 to 37, characterized in that the drilling fluid is an aqueous silicate-free fluid and in that the polymer comprises the alkoxyated units.